Laboratories for the 21st Century
Supplementary Information—August 13, 1999

LABS21 PROPOSAL AND PROGRAM ELEMENTS

EPA is proposing that the Laboratories for the 21st Century (Labs21) Initiative have the following elements:

- Voluntary goals for laboratory energy and water efficiency
- Criteria for Labs21 recognition
- National database of current laboratory energy and water consumption
- Forums for the exchange of technical information on energy and water efficiency
- National recognition of Labs21 Champions

Each of these elements is described in greater detail below.

Voluntary Energy- and Water-Efficiency Goals

EPA is proposing to establish voluntary energy- and water-efficiency goals for new and retrofit laboratories. To establish these voluntary goals, EPA will:

- Evaluate existing efficiency measurement tools or develop new tools based on either of the following:
  - Statistical regression by region, laboratory size, laboratory type, and other relevant variables.
  - Project-specific "energy indices" based on "ideal" efficiencies achievable within comparable laboratory designs.
- Propose the tool identified or developed above as a standard for measuring energy and water efficiency in laboratories.
- Separate "process loads" (i.e., energy consumed by laboratory equipment such as centrifuges, dynamometers, computers, fax machines, and photocopiers) from the laboratories' energy-efficiency measurements and other technologies to ensure fair comparisons can be made between different types of laboratory facilities.
- Recommend efficiency standards for laboratory hardware such as chillers, fans, motors, and fume hoods.

- Review goals annually and adjust if necessary.

Criteria for Labs21 Recognition

As described in the *Preliminary Labs21 Information*, dated July 7, 1999, EPA envisions two levels of participation in the Labs21 Initiative—members and champions. Laboratories can become members of Labs21 by agreeing to conduct energy- and water-efficiency audits of their laboratory facilities. Labs21 champions will include laboratory facilities EPA publicly recognizes for their energy- and water-efficiency performance.

EPA proposes to recognize Labs21 champions if they meet criteria to be developed by EPA following the September 8 meeting. EPA is proposing to establish the criteria so that approximately 10 percent of new and retrofitted laboratories will qualify. For example, EPA might determine that any laboratory with an energy- and water-efficiency rating 20 percent better than an established baseline (or a similar percentage to be established later) will be recognized. EPA is planning to establish additional criteria so that approximately 1 percent of laboratories would qualify for more prestigious recognition. A laboratory might need to achieve an efficiency rating 50 percent better than the baseline (or a similar percentage) to obtain the higher recognition level.

Some of the criteria and procedures EPA is considering include the following:

- Guaranteeing performance or demonstrating actual energy and water consumption 20 or 50 percent better than the established baselines as described above.

- Demonstrating a laboratory design that incorporates an integrated "systems approach" to improve the energy and water efficiency of the laboratory including how the laboratory helps achieve the simultaneous goals of energy and water conservation and pollution prevention. Such a design would:

    - Reduce power plant source emissions
    - Optimize energy and water cost savings
    - Minimize energy and water waste
    - Maximize use of waste energy and water streams
    - Use renewable energy.
    - Optimize the use of onsite power and cogeneration

- Incorporating fully automated, "intelligent" building operation features including facility-wide sensing and control technologies that allow the building to self adjust, to optimize energy and water efficiencies, to evaluate system performance, and to provide operational diagnostics.

- Tracking energy and water consumption data by component end use in order to know how energy and water are being used in the laboratory.

- Minimizing overall environmental impacts as measured by factors such as energy and water consumption and emissions of SO_X and NO_X.

- Incorporating the use of renewable energy technologies and renewable energy purchases.

- Incorporating energy system designs and renewable energy strategies that, when evaluated as a comprehensive system, guarantee a simple payback period on capital investment of up to 10-years.

- Selecting building materials that require minimal resource consumption to manufacture, deliver, and install.

National Database

EPA is proposing to create a national database of existing laboratory energy- and water-consumption data. The data will be segmented by laboratory type, laboratory size, geographic location, fuel type, and other relevant data elements. The data will then be used to track national increases in energy and water efficiency and as a benchmark to quantify the efficiency of the nation's laboratories.

To implement the database, EPA will:

- Complete a literature search to identify existing data sources and related bench marking efforts and methodologies.

- Establish a database task force with industry and academia to exchange information on database development.

- Identify the "fields" to be captured in the database, including the following:

  - Laboratory type (e.g., chemical, biological, teaching, etc.).
  - Laboratory size.
  - Number of fume hoods.
  - Energy consumption per square foot or per unit of output.
  - Water consumption per square foot or per unit of output.
  - Use profile (e.g., occupancy rates, number of hours fume hoods are in use, etc.).
  - Energy source (e.g., onsite generation, purchase from local generator, use of renewable energy, use of fossil fuels, etc.).
  - Water source (e.g., local municipality, onsite wells, local lake or river, etc.)
  - A list of the building system components that consume energy or water.

- Develop a Web-based instrument to collect data on federal and private laboratories.

- Collect data from federal laboratories.

- Survey a sample of private sector and academic laboratories.

- Publish an annual report aggregating U.S. laboratory energy- and water-consumption data.

Forums for the Exchange of Technical Information

To promote the exchange of information, EPA will:

- Sponsor an annual technical conference.
- Provide peer review support or other technical assistance to Labs21 participants to review laboratory design or upgrade projects.
- Support a Labs21 Web site capable of hosting "virtual conferences" and containing the following features:
  - Providing access to the "LBNL Design Guide," an energy- and water-efficiency design guide for laboratories developed by Lawrence Berkeley National Laboratories.
  - Including e-mail access to energy- and water-efficiency experts with laboratory design or retrofit experience.
  - Providing opportunities for users to compare their laboratory efficiencies with other similar laboratories.
  - Providing access to sample contract language containing energy- and water-efficiency clauses that can be incorporated into requests for purchases, solicitation for offers, purchase order requests, and other contracting mechanisms for laboratory design and upgrades.
  - Posting papers from technical conferences addressing laboratory energy and water efficiency.

National Recognition of Labs21 Champions

EPA is proposing to heavily promote the Labs21 Initiative and will recognize those universities and companies that have elected to participate. EPA is considering the following activities:

- Writing and distributing regular press releases.
- Publishing a newsletter.
- Attending conferences to present the Labs21 Initiative.
- Preparing articles for publication in trade journals.

- Filming a promotional video.
- Preparing mass mailings.
- Hosting special events such as a Labs21 awards ceremony.
- Developing outreach partnerships with state and local governments, utilities, vendors, and trade associations.